

LIST OF FISHES COLLECTED IN 1883 AND 1885 BY PIERRE  
LOUIS JOUY AND PRESERVED IN THE UNITED STATES  
NATIONAL MUSEUM, WITH DESCRIPTIONS OF SIX NEW  
SPECIES.

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During the year 1883 the late Pierre Louis Jouy, then an assistant to the U. S. National Museum, visited Japan, making a small but very valuable collection of rare forms of fishes, many of which he obtained from the markets of Yokohama. During 1885, on his way to Korea, he also visited Sasuna, the port of the Japanese island of Tsushima, in the Straits of Korea.

In the present paper is given a list of the species collected in 1883 and 1885, with descriptions of new ones, accompanied by plates drawn by Mr. William Sackston Atkinson, Miss Lydia M. Hart, and Mrs. Chloe Leslie Starks. A few Japanese fishes from other sources contained in the U. S. National Museum are also mentioned. Comparisons have been made with specimens in the very large Japanese collections, as yet undescribed, made by the writers in 1900. The specimens mentioned are in the U. S. National Museum, a few duplicates being retained for the museum of Stanford University. The writers are under obligation to Mr. Richard Rathbun and to Mr. Barton A. Bean for many favors in connection with the study of this collection.

MEASUREMENTS.

The measurements given in the tables were made by means of dividers and a proportional scale. In some cases they will be of great value as an aid in discriminating between closely related species. It is believed also that they will show, in an approximately definite way, some of the variations of certain characters useful in the determination of relationships.

They are expressed in hundredths of the length of the body, which is measured from the tip of the snout to the end of the last vertebra.

The depth of the body is measured at its deepest part; depth of caudal peduncle at its narrowest place; length of caudal peduncle from base of last anal ray to end of last vertebra; length of head from tip of snout to posterior edge of opercle; length of snout from its tip to anterior margin of orbit; width of interorbital space measured on the skull, the dividers compressed tightly between the eyes; diameter of orbit, longitudinally; length of caudal fin from end of last vertebra to tip of longest rays. Only fully developed fin rays are counted. The rudimentary rays of dorsal and anal, when closely adnate to the first branched ray, are counted with it as one ray. When the soft dorsal contains a spine it is enumerated as a ray; when last ray of dorsal or anal is double it is counted as one. Scales in the lateral series are counted to base of caudal fin; transverse series from insertion of ventrals or anal, whichever is nearer middle of body, upward and forward; above or below lateral line, as indicated in the description.

The new species described are the following:

*Leuciscus jonyi*, Sasuna, Tsushima.

*Apoogon unicolor*, near Yokohama.

*Pomacentrus rathbuni*, near Yokohama.

*Aboma tsushima*, Tsushima (Sasuna).

*Chasmias misakius*, Misaki, Sasuna, in Tsushima.

*Watasea sivicola*, Misaki; Nanaura in Awa.

In addition to these, four new names are given in place of names already used in the same genus. These are *Limanda herzensteini*, *Chavrops azurio*, *Pygosteus steindachneri*, *Cobitis biwa*.

Two genera, *Watasea* and *Chasmias*, are described as new.

### Family SQUATINIDÆ.

#### 1. SQUATINA JAPONICA Bleeker.

591. Yokohama.

Common throughout southern Japan. It has never been carefully compared with *Squatina squatina* nor with *Squatina californica*, and may not be distinct.

### Family NARCOBATIDÆ.

#### 2. ASTRAPE JAPONICA (Schlegel).

626. Yokohama.

Rather rare. It has never been critically compared with the East Indian *Astrape dipterygia* (Müller and Henle) and may be the same, as supposed by Dr. Günther.

## Family DASYATIDÆ.

## 3. DASYATIS KUHLI (Müller and Henle).

590. Yokohama.

Common in sandy bays throughout middle and southern Japan. Known in life by its gray or whitish lower side, the still more common *D. akajei* being dull orange.

## Family CYPRINIDÆ.

## 4. CARASSIUS AURATUS (Linnæus).

Oide, near Sendai, in Rikuzen.

Common in all streams of middle and southern Japan.

## 5. LEUCISCUS HAKUENSIS (Günther).

511, 513, 516, 517, 518. Lake near Oide, near Sendai, Japan.

Scales 75; dorsal inserted behind ventrals. Very common in all streams of the northern half of the main island of Hondo, also in Hokkaido. Unlike most other minnows it runs far out to sea. In two specimens (513, 517) the body is unusually elongate, and the ventrals are placed further back, almost under the dorsal.

## 6. LEUCISCUS JOUYI, Jordan and Snyder, new species.

(Plate XXXI.)

No. 45,228, U. S. N. M. Sasuna, island of Tsushima. 1885, twelve specimens.

The island of Tsushima affords a species of *Leuciscus*, heretofore unknown, which is very different from *L. hakuensis*, the form common to the greater part of Japan. It is distinguished principally by its depressed head, deep caudal peduncle, and comparatively short anal fin.

We describe it as *Leuciscus jouyi* from type No. 45,228, U. S. N. M. Locality, Sasuna, Tsushima.

Head 4 in length, depth  $3\frac{1}{2}$ , depth of caudal peduncle  $6\frac{2}{3}$ , eye  $4\frac{1}{2}$  in head, snout 3, interorbital  $2\frac{1}{2}$ , D. 8, A. 8, P. 16; scales in lateral line 68, above lateral line 18; between insertion of dorsal and occiput 41. Teeth 2.5-4.2.

Body deep and compressed, the caudal peduncle notably so. Head very small, pointed, depressed; the width equal to the depth. Interorbital space wide, low, somewhat convex.

Eye large; nearer to tip of snout than to edge of opercle, a distance equal to its diameter. Snout sharp, the jaws equal in length. Mouth small, oblique; lips thin, maxillary reaching a vertical through posterior edge of orbit. Gill-rakers on first arch 2+6; short, pointed, and far apart. Pharyngeal teeth in two rows; 5-2 on the left side,

4-2 on the right. Those of the major row high, compressed side-wise; the one near the longer straight limb of the arch somewhat rounded and short; one or two teeth on each side slightly hooked; grinding surface present, though not very broad. Teeth of secondary row slender, easily displaced; one on each side showing traces of a grinding surface. Peritoneum silvery. Air-bladder large, with one constriction; alimentary canal short, without convolutions.

Head naked, without barbels or other distinctive dermal characters. Body with scales of medium size. Lateral line complete, not extending on caudal fin; the anterior part bending downward parallel with the ventral contour; posterior part of lateral line in middle of caudal peduncle.

Dorsal inserted midway between center of eye and base of caudal fin; the first ray very short, simple, and closely adnate to the second; third ray longest. Anal inserted a little posterior to base of dorsal, its base short; first simple ray similar to that of dorsal; third ray longest; tips of rays when fin is depressed falling far short of base of caudal. Pectoral fins rather pointed. Ventrals rounded, reaching anal opening.

Body a little darker above than below; a faintly defined, narrow, lighter band along the sides, not visible anterior to the dorsal fin.

One of the cotypes (No. 6,376, Leland Stanford Jr. University Collection) has three teeth on one side in the lesser row.

The collector's notes do not state whether the species was found in salt or fresh water, a question of interest, since the island of Tsushima is said to contain only 262 square miles, about one-third of which is cut off from the larger part by a narrow channel. *Leuciscus hakuensis* is able to live in salt water, the authors having found it in tide pools and offshore at several points along the coast of Japan.

*Measurements of Leuciscus jouyi.*

Length of body in millimeters.....	129	106	95	89	81	66	61	53
Depth of body expressed in hundredths of length.....	.27	.28	.27	.27	.26	.22	.23	.24
Depth of caudal peduncle.....	.14	.14	.155	.16	.15	.14	.13	.14
Length of head.....	.26	.25	.25	.265	.26	.26	.26	.26
Depth of head at occiput.....	.15	.145	.15	.15	.14	.145	.16	.17
Width of interorbital space.....	.10	.095	.09	.09	.085	.08	.09	.09
Length of snout.....	.085	.08	.08	.085	.085	.08	.08	.08
Diameter of orbit.....	.05	.05	.06	.06	.06	.07	.06	.07
Distance from snout to dorsal fin.....	.56	.55	.555	.58	.58	.55	.58	.56
Height of longest dorsal rays.....	.18	.18	.20	.20	.185	.19	.18	.19
Distance from snout to anal fin.....	.67	.68	.67	.69	.69	.66	.68	.67
Height of longest anal rays.....	.15	.11	.17	.17	.15	.15	.15	.15
Distance from anal to caudal fin.....	.25	.23	.26	.25	.245	.22	.25	.25
Length of caudal fin.....	.25	.265	.27	.255	.25	.25	.27	.27
Distance from snout to ventral fin.....	.52	.51	.51	.47	.54	.52	.50	.51
Length of ventral fin.....	.11	.135	.15	.16	.145	.14	.13	.14
Length of pectoral fin.....	.17	.16	.18	.18	.18	.16	.17	.18
Number of rays in dorsal fin.....	8	8	8	8	8	8	8	8
Number of rays in anal fin.....	8	8	8	8	7	8	8	8
Number of rays in pectoral fin.....	16	16	16	16	15	15	16	16
Number of scales before insertion of dorsal fin.....	11	38	37	42	45	43	40	40
Number of scales in lateral line.....	68	65	63	68	69	64	72	68
Number of scales above lateral line.....	18	16	18	17	19	19	18	19

## 7. ACHEILOGNATHUS ?LANCEOLATUM (Schlegel).

519. Lake near Oide. A single specimen of the species common in northern Japan, which may not be different from *A. lanceolatum*.

## Family ANGUILLIDÆ.

## 8. ANGUILLA JAPONICA Schlegel.

No. 45223, U.S.N.M. Sasuma, Tsushima.

The eel is exceedingly common in all fresh and brackish waters of Japan. It is very close to the eel of Europe, *Anguilla anguilla*, and may prove inseparable from it.

## 9. LEPTOCEPHALUS MYRIASTER (Brevoort).

Yokohama.

## Family CLUPEIDÆ.

## 10. CLUPANODON THRISSA (Osbeck).

(*Chatoëssus punctatus* Schlegel.)

No. 38837, U.S.N.M. Yokohama.

The name *Clupanodon* in our judgment should be retained for the species (*thrissa* Osbeck) to which it was first applied. The "method of elimination" would assign the same type if we admit *Konosirus* as a genus distinct from *Dorosoma*. In this view *Thrissa* Rafinesque and *Konosirus* Jordan and Snyder are synonymous with *Clupanodon*.

## Family PTEROTHRISSIDÆ.

## 11. PTEROTHRISSUS GISSU Hilgendorf.

(*Bathylthriissus dorsalis* Günther.)

Locality uncertain, probably from Hakodate, where the species is common in rather deep water.

## Family SALMONIDÆ.

## 12. SALMO MACROSTOMUS Günther.

502.

Skin from Lake Chuzenji, about 18 inches long. Small black spots on head, along back, and on caudal. No parr marks. Snout produced as in breeding males. B. 12, A. 12 (developed rays). Gill rakers 7 + 12. Scales 135. This agrees with *Salmo macrostomus* of Günther, the Yamabe or Yamomi of the fishermen, a species now abundant in Chuzenji Lake, having been planted from the river below the fall of Kegon-no-taki. Lake Chuzenji above this high waterfall was without fish until this and other species were planted there.

## 13. PLECOGLOSSUS ALTIVELIS Schlegel.

505, 506, 507. Numata.

727. Sasuma, Tsushima.

This dwarf salmon, the famous Ayu, one of the most delicate of all food fishes, runs in abundance in all clear streams of Japan.

## Family AULOPIDÆ.

## 14. AULOPUS JAPONICUS Günther.

(Plate XXXII.)

563. Yokohama market. A fine specimen in good condition.

## Family SYNGNATHIDÆ.

## 15. SYNGNATHUS SCHLEGELI Kaup.

No. 45261 (769), U.S.N.M. Yokohama.

If we accept as the type of a Linnaean genus its "best-known European or officinal species," we may retain the name *Syngnathus* for *S. acus* and its allies, instead of following Rafinesque's restriction of the Linnaean name to *Nerophis pelagicus*.

## Family MUGILIDÆ.

## 16. MUGIL OUR Forskål.

Yokohama.

We refer the common mullet of Japan (*Mugil japonicus* Schlegel) to *Mugil our* of the Red Sea, following the opinion of authors, having no data of our own.

## Family TRACHICHTHYIDÆ.

## 17. HOPLOSTETHUS JAPONICUS Hilgendorf.

621. Yokohama market. 1883. A fine specimen in good condition.

## Family HOLOCENTRIDÆ.

## 18. MYRIPRISTIS JAPONICUS Schlegel.

Yokohama.

## Family BERYCIDÆ.

## 19. BERYX SPLENDENS Lowe.

No. 38836, U.S.N.M. Yokohama.

A fine example, agreeing fairly with the figure of the Atlantic species given by Goode and Bean.

## Family POLYMIXIIDÆ.

## 20. POLYMIXIA JAPONICA Günther.

Probably Yokohama.

It is common at some depth outside the headlands (Awa, Misaki), which bound the Bay of Tokio.

## Family SCOMBRIDÆ.

## 21. SCOMBER JAPONICUS Houttuyn.

*Scomber japonicus* Houttuyn, 1782.

*Scomber auratus* Houttuyn, 1782.

*Scomber colias* Gmelin, 1788.

*Scomber pneumatophorus* Delaroche, 1805.

583. Yokohama.

The common mackerel of Japan is not visibly different from the smaller mackerel (*colias*, *diego*, and *dekayi*) of the rest of the world. The name *japonicus* given by Houttuyn in 1782 is older than any other. We are indebted to Mr. Barton A. Bean for a copy of the descriptions given by Houttuyn<sup>1</sup> of the fishes from Japan placed in his hands by Dr. Carel Thunberg. These descriptions represent the earliest record of Japanese fishes, and the names of Houttuyn must have precedence over all others, if his descriptions can be identified.

Unfortunately, Houttuyn had little knowledge of fishes. His descriptions are very loosely drawn, and the fin rays in almost all cases are incorrectly given. Still, knowing the fauna of Nagasaki, from which region the specimens of Thunberg must have come, it is not very difficult in most cases to indicate the species intended.

The following identifications seem to us tenable:

## NOTE ON THE SPECIES OF HOUTTUYN, 1782.

## 1. CALLIONYMUS JAPONICUS.

Evidently *Callionymus longicaudatus* Schlegel, as recognized by Schlegel himself. It must therefore stand as *Callionymus japonicus*. D. IV-10; A. 8. C. 9. The tail 4 inches long, the body 5½, a black ocellus on front dorsal.

## 2. URANOSCOPUS JAPONICUS.

Doubtless *Uranoscopus asper* Schlegel. It must stand as *Uranoscopus japonicus* Houttuyn.

D. IV-15; P. 12. First dorsal black; body yellow above, white below. Based, like most of Houttuyn's descriptions, on a young specimen.

## 3. CORYPILENA JAPONICA.

Apparently *Latilus sinensis* = *L. argentatus* Cuvier and Valenciennes. The species must stand as *Latilus japonicus*.

<sup>1</sup>Beschryving van eenige Japansche visschen, en andere zee-schepselen; door M. Houttuyn, in Verhandelingen, uitgegeeven door de Hollandsche Maatschappij der Weetenschappen te Haarlem, XX Deels, 2 Stuk, 1782, pp. 311-346. This paper has been kindly translated for us by Mr. Leo G. D. Muller, of Stanford University.

It is, according to Houttuyn, a Dolphin, from its blunt head. Color apparently bright yellow but not preserved very well. Closed gill coverings with a groove crosswise. D/24; P. 14; V. 6; C. 17. Body covered with fine scales. Lacépède calls this species *Coryphænooides houttuyni*, but his generic name *Coryphænooides* was used still earlier by Gunner for a Macrurid.

4. *Gobius niger* Linnæus.

Some Goby incorrectly identified.

5. *Pleuronectes japonicus*.

Japanese Scharretong.

Form of the European Scharretong. Eyes on the left side. P. 9; V. 5; C. 16. Dorsal and anal rays not counted owing to the great number. Body 6 inches long, somewhat round on the dorsal side, and white below.

This may be *Paralichthys olivaceus*, but we hesitate to make the identification.

The name *Pleuronectes japonicus* given by Herzenstein to a common flounder of the island of Hokkaido, is preoccupied by *Pleuronectes japonicus* of Houttuyn. Herzenstein's species may receive the new name of *Limanda herzensteini*.

6. *Sparus auratus* Linnæus.

An erroneous identification with a European species.

7. *Sparus argentatus*.

This is *Sciæna sinu* Schlegel, *Sciæna schlegeli* Bleeker. It may stand as *Corvula argentata*. Black spot on opercle; color of body silvery. D. IX, 26; P. 16; V. 9; A. 1, 8; C. 18. Length 8; depth  $2\frac{1}{2}$  inches.

8. *Sparus notatus*.

This is a species near *Apogon semilineatus* Schlegel, but not recognized by later writers. It may stand as *Apogon notatus*.

Small black spots behind the gill coverings, close to the caudal fin, and on the dorsal fin. Hardly a finger long and covered with silvery scales. Dorsals, two. D. V-8; A. 8; P. 10; C. 14.

9. *Sparus erythrinus* Linnæus.

An incorrect identification of a European species.

10. *Sparus latus*.

This must be *Chrysopteryx aries* Schlegel, which must stand as *Sparus latus*.

Scales in stripes lengthwise. In body one of the widest of the family if not the widest, half as wide as long. Color, yellowish; the head silvery under the scales. D. XII, 9; P. 12; A. III, 8; V. 1, 5; C. 18.

11. *Sparus virgatus*.

This seems to be *Dentex setigerus* of Schlegel = *Nemipterus sinensis*. It may stand as *Nemipterus virgatus*.

Stripes of the scales plainer and larger than in *Sparus latus*. Similar to the Salpa of authors, which has on each side eleven stripes of a golden hue, hence called in French "Virgadelle." Body oval and flat, head obtusa, tail forked. D. VIII, 10; P. 12; A. II, 8; V. 6; C. 22. Length,  $5\frac{1}{2}$  inches.

12. *Sparus fuscescens*.

This seems to be a *Sebastodes*, *Sebastodes inermis* = *Sebastodes ventriosus* without much doubt. The species may therefore stand as *Sebastodes fuscescens*.

A black spot on the pectoral fin, body brownish, the color perhaps due to "the falling off of some golden scales." Body fairly wide; mouth armed with small teeth; lateral line straight. D. XIII, 11; P. 16; V. 1, 5; A. II, 10. Length, 4 inches.

13. *Labrus japonicus*.

We can not make this out. Gill coverings scaly. Small sharp-pointed teeth, and not double lips; pectorals sharp; lateral line almost straight. D. X, 11; P. 16; V. 1, 5;



A. 111, 5; C. 18. Color bright yellow. Length, about 6 inches; depth, 2; thickness, 1 inch. It is perhaps most like *Pseudolabrus cothinus*.

The name *Labrus japonicus* Schlegel, is preoccupied by this name of Houttuyn. Schlegel's species may receive the new name of *Chærops azurio*. It is a common food fish of Southern Japan.

#### 14. LABRUS BOÏPS.

This is *Scombrops cheilodipteroides* Bleeker, and may stand as *Scombrops boops*.

Eyes very large, more than half an inch in diameter, thus taking up a very large part of the head. Gill covers scaled. Lower jaw, the longer with fairly long and sharp teeth. Dorsal fins, 2. D. V. 12; P. 14. V. 1, 5; A. 11; C. 22.

#### 15. PERCA FASCIATA.

This seems to be *Epinephelus septemfasciatus* (= *susuki* = *octocinctus*). The same name *Perca fasciata* was given still earlier by Forskål, to another species also found in Japan, *Epinephelus fasciatus* (= *marginalis*) the type of the genus *Epinephelus*.

#### 16. GASTEROSTEUS VOLITANS LINNÆUS.

This is *Pterois volitans* and refers to *Pterois lunulata* Schlegel.

#### 17. GASTEROSTEUS JAPONICUS.

This is *Monocentris japonicus*, a species of which Houttuyn justly says: "I have never seen the equal of it." The same name *Gasterosteus japonicus* has been given by Steindachner to a true stickleback. The name of the latter thus preoccupied may be changed to that of *Pygosteus steindachneri*.

#### 18. SCOMBER JAPONICUS.

This is the common mackerel of Japan, the Saba of the fisherman. We can not separate it from *Scomber colias* of Europe. Houttuyn's name *Scomber japonicus*, 1782, has priority over *Scomber colias* Gmelin, 1788, or *Scomber pneumatophorus* Delaroché, 1805.

#### 19. SCOMBER AURATUS.

A little mackerel, 7 inches long, distinguished by its gilded color. D. IX, —; finlets, 5; P. 18; A. 6; V. 6. This must be the same as *Scomber japonicus*.

#### 20. SCOMBER TRACHURUS LINNÆUS.

A common Japanese fish, close to *Trachurus trachurus*, apparently the same.

#### 21. CENTROGASTER FUSCESCENS.

This is *Siganus fuscescens*, from which Schlegel's *Amphacanthus albopunctatus* and *aurantiacus* do not seem to be different.

*Centrogaster* (= *Siganus* Forskål = *Amphacanthus* Bloch) is a new genus defined by the "strange growth of the ventral fins, which are like those in the Snottelf, named by Mr. C. Noseman, *Cyclogaster*, grown together by a membrane which in this case is supported by four sharp spines and six limber rays." The name is here misprinted "Cantrogaster." The confusion of the structure of the ventrals in *Siganus* with that found in *Liparis* shows that Houttuyn had no training in ichthyology.

#### 22. CENTROGASTER ARGENTATUS.

This is *Leiognathus*, or *Equula nuchale*, one of the commonest of Japanese fishes. It may stand as *Leiognathus argentatum*.

Entirely silvery, as if covered with silver plate. A large, round, brown spot on the back behind the head, and a black one in the dorsal fin. D. VIII; A. 11, 12. Depth, 1½; length, 3 to 4 inches.

#### 23. MULLUS JAPONICUS.

This is some species of *Upeneus*. It has been regarded as *Mullus bensasi* Schlegel, but there is little certainty of this identification. D. VII-9. Caudal forked; mouth toothless. Color more yellow than red. Length, 6 inches. A specimen from Tokyo agrees with Houttuyn's account.

24. *MULLUS IMBERBIS* Linnaeus.

Incorrect identification of some *Apogon* with a Linnaean species.

25. *TRIGLA ALATA*.

This is *Lepidotrigla burgeri* (Schlegel) and must stand as *Lepidotrigla alata*.

Four inches long; head not rounded; the upper maxillary with two sharp, protruding points, such as are also behind on the gill coverings. P. 7-3; D. VII; A. 14; C. 14; V. 6. Dorsal fin in a bony groove made by two rows of sharp scales along the back.

26. *COBITIS JAPONICA*.

This is *Saurida argyrophanes*, or some other species of soft rayed fish. Head beardless, rather short; mouth in both jaws full of sharp teeth; body, terete and fleshy, like that of a snake or an eel. D. 12; P. 12; V. 8; A. 9. Length, 5 inches. We do not feel sure of the identification.

The name *Cobitis japonicus* Schlegel, applied to the common "Shimadojo" or striped loach of Japan, is thus preoccupied, and may give place to the new name *Cobitis biwæ* from the largest of the Japanese lakes, where the species abounds.

27. *SILURUS INERMIS*.

This is a *Platycephalus*, in all probability *Platycephalus crocodilus* Tilesius = *guttatus* Schlegel. The species may stand as *Platycephalus inermis*.

No barbels or serrated pectoral spine. Body terete, scaled. Head very flat, with large eyes, close together as in the Stargazer. Opercle with two fine spines. D. VII-11; P. 20; V. 6; A. 10; C. 13. Caudal fin roundish, black and white spotted—like all the other fins. Body reddish. Jaws without teeth. Length, 6 inches.

28. *FISTULARIA TABACARIA* Linnaeus.

Incorrect identification of an Atlantic species.

29. *ATHERINA JAPONICA*.

The species, the type of Lacépède's genus *Stolephorus*, is certainly *Spratelloides gracilis* (Schlegel). It is identified by Bleeker with *Atherina bleekeri* Günther, a species common at Nagasaki. Günther regards it as identical with *Engraulis comersonianus*, a Chinese anchovy, not yet found in Japan. But the description almost certainly belongs to *Spratelloides*, to which genus the name *Stolephorus* must be transferred, the species standing as *Stolephorus japonicus*.

The genus of Anchovies, heretofore called *Stolephorus* by us, must stand as *Anchoria* Jordan and Evermann, unless it be reunited with *Engraulis*, from which it does not greatly differ.

The remaining species are all those of Linnaeus or Osbeck, correctly or incorrectly identified.

30. *CLUPEA THRISSEA*, *Clupanodon thrissa* (Osbeck) = *Konosirus punctatus* (Schlegel).31. *RAJA RHINOBATUS* is probably *Rhinobatus schlegelii*.32. *SQUALUS CANICULA* is probably *Halaburus burgeri*.33. *LOPHIOS PISCATORIUS* is *Lophionus setigerus*.34. *BALISTES MONOCEROS* is *Aluteres monoceros*.35. *OSTRACION QUADRICORNIS* is *Ostracion cornutum* or *Aracana aculeata*36. *OSTRACION CUBICUS* is *Ostracion tuberculatum*.

## Family CARANGIDÆ.

22. *TRACHURUS TRACHURUS* (Linnaeus).

(*Caranx trachurus japonicus* Schlegel.)

## 585. Yokohama.

We find no difference between this most abundant fish and *Trachurus trachurus* of the Atlantic.

## 23. CARANGUS EQUULA (Schlegel).

Yokohama.

Generally common. It is probable that Gill and Bleeker are right in regarding *Caranx speciosus*, the only species known to Commerson, as the type of the genus *Caranx* accepted by Lacépède from Commerson's manuscripts. *Carangus* Griffith should be preferred to *Tricropterus* Rafinesque of earlier date, because under *Tricropterus* no species were mentioned by its author.

## Family APOGONIDÆ.

## 24. APOGON UNICOLOR Döderlein Ms., new species.

(Plate XXXIII.)

*Apogon unicolor* is here described from the type No. 49708, U.S.N.M., a specimen 75 millimeters long, in a poor state of preservation. Collected at Yokohama, Japan, by P. L. Jouy.

Head,  $2\frac{2}{3}$  in length; depth,  $2\frac{5}{6}$ ; depth of caudal peduncle,  $6\frac{1}{2}$ ; diameter of eye,  $3\frac{1}{4}$  in head; snout,  $3\frac{2}{3}$ ; maxillary,  $1\frac{1}{2}$ . D. VI-I + 9; A. II + 8; P. 13. Scales in lateral line 24; between lateral line and spinous dorsal 2; between lateral line and anal 13.

Depth of body a little less than length of head; the caudal peduncle long and comparatively slender, narrowest near the middle. Interorbital space convex. Snout bluntly pointed.

Eye large; the diameter greater than length of snout. Mouth oblique; jaws equal; maxillary reaching almost to posterior edge of orbit; its upper edge covered for nearly the entire length by the suborbital. Teeth villiform; in bands on jaws, palatines, and vomer; the toothed area of the palatines very small. Gill-rakers on first arch, 5+13; those near the center of the arch very slender; near the ends they are reduced to minute knobs.

Opercles and preopercles with large, weakly ctenoid scales; other parts of head naked, the skin thin and transparent; opercle with a small, sharp spine on its posterior edge. Body with large, ctenoid scales; those on posterior end of caudal peduncle small, encroaching on base of caudal fin. Lateral line complete; similar in shape to contour of back.

First spine of dorsal small, little longer than the sixth; the second strongest and highest; the others successively shorter and weaker; the fin where depressed reaching just past insertion of second dorsal. Spine of soft dorsal slender and straight; equal in height to vertical diameter of eye; the rays about one and two-third times as long as the spine. Anal inserted directly below middle of second dorsal; the first spine minute; the second as long as the spine of soft dorsal; the depressed rays reaching posteriorly about as far as those of the dorsal,

both falling short of the base of the caudal. The shape of the caudal can not be definitely determined; it probably was round posteriorly, at least not deeply forked. Pectorals reaching as far back as insertion of anal. Ventrals extending to a point midway between vent and anal.

Color in spirits, uniform light yellowish brown, except a subdued, dusky dash across the distal end of pectoral, and an indistinct spot of same color on the opercle near the base of pectoral. It was doubtless nearly plain red in life, without spot or band.

This seems to be the species recorded from Tokio by Steindachner and Döderlein under the name of *Apogon bifasciatus* Rüppell. But the species shows no trace of dark bars and can not be Rüppell's species, which came from the Red Sea. Döderlein records it under the manuscript name of *Apogon unicolor*, which name Steindachner does not adopt.

*Measurements of Apogon unicolor.*

Length of body in millimeters .....	.59
Depth of body expressed in hundredths of length ....	.35
Depth of caudal peduncle.....	.15
Length of head.....	.38
Depth of head at occiput.....	.27
Width of interorbital space .....	.08
Length of snout.....	.09
Length of maxillary .....	.19
Diameter of orbit.....	.12
Distance from snout to spinous dorsal .....	.46
Height of longest dorsal spines .....	.17
Height of longest dorsal rays.....	.22
Distance from snout to anal fin .....	.67
Height of longest anal rays .....	.23
Length of caudal peduncle .....	.27
Length of caudal fin .....	.29
Distance from snout to ventral fin.....	.40
Length of ventral fin .....	.25
Length of pectoral fin .....	.28

The generic name *Ostorhinchus* Lacépède may be used as a genus or subgenus for the species of *Apogon*, having seven dorsal spines, all the Atlantic species or true *Apogon* having six.

25. **SCOMBROPS BOOPS** (Houttuyn).

(*Scombrops cheilodipteroïdes* Bleeker.)

2352, 2538 Yokohama; 45305 (729), Tsushima, 1885.

Everywhere common along the coasts of middle and southern Japan, in rather deep water.

Family **SERRANIDÆ**.

26. **NIPHON SPINOSUS** Cuvier and Valenciennes.

619. Yokohama.

This large species is nowhere very common. It is most frequently seen about Tokyo.

27. *LABRACOPSIS JAPONICUS* Steindachner and Döderlein.

Yokohama. Two specimens.

Rare; known only about Tokyo. Colors faded, apparently red in life, a broad pale lateral band broader than eye running from upper posterior angle of opercle, and narrowly edged above and below with darker. Caudal with a narrow black stripe cutting off the angles, which are whitish.

28. *CHELIDOPERCA HIRUNDINACEA* (Cuvier and Valenciennes).

603 (2 specimens). Yokohama.

Very rare, taken in the Kuroshiwo about Tokyo.

29. *EPINEPHELUS SEPTEMFASCIATUS* (Thunberg).

(*Serranus octocinctus* Schlegel.)

No. 45307 (726), U.S.N.M. Sasuna, Tsushima, Japan. 1885, two examples.

Common along the coasts of Hondo and Kiushu.

## Family PENTACERIDÆ

30. *HISTIOPTERUS TYPUS* Schlegel.

625. Yokohama.

Rather rare, from off Tokyo southward.

## Family PRIACANTHIDÆ

31. *PSEUDOPRIACANTHUS NIPHONIUS* (Cuvier and Valenciennes).

624. Yokohama.

Rather rare, from Misaki southward.

## Family HÆMULIDÆ

32. *PLECTORHYNCHUS CINCTUS* (Cuvier and Valenciennes).

618. Yokohama.

Common, from Tokyo southward.

33. *SCOLOPSIDES INERMIS* Schlegel.

Yokohama.

This specimen agrees with Günther's description and Schlegel's figure in essential respects. Scales 34.

A second specimen, No. 623, Yokohama, has the body deeper. Depth,  $3\frac{3}{5}$  in length to base of caudal; head,  $3\frac{1}{5}$  in length; eye,  $2\frac{4}{5}$  in head. D. X, 8. Color in both red, with faint darker cross-bands.

## Family SPARIDÆ.

## 34. SPARUS SCHLEGELI (Bleeker).

Yokohama.

This common species needs comparison with others found in the East Indies and off the coast of India. It is abundant in all harbors of Hondo and Kiushu.

## Family KYPHOSIDÆ.

## 35. GIRELLA PUNCTATA Gray.

No. 26260, U.S.N.M. Tokyo probably. (Coll. Edward S. Morse.)  
Everywhere common about rocks on shores of Hondo and Kiushu.

## Family SCLÆNIDÆ.

## 36. CORVULA ARGENTATA Houttuyn.

*(Sciæna schlegeli* Bleeker.)

578. Yokohama.

Generally common in sandy bays.

## Family CIRRHITIDÆ.

## 37. CHEILODACTYLUS ZONATUS Cuvier and Valenciennes.

577. Yokohama.

Generally common in Kiushu and Hondo.

## Family POLYNEMIDÆ.

## 38. POLYDACTYLUS PLEBEIUS (Broussonet).

Yokohama (2).

In sandy bays from Tokyo southward, not very common.

## Family EMBIOTOCIDÆ.

## 39. NEODITREMA RANSONNETI Steindachner.

45311. Tsushima.

One large specimen in bad condition. This species seems very local in its distribution, occurring in abundance in Koajiro Bay, near Misaki, but not seen elsewhere by us.

## Family POMACENTRIDÆ.

## 40. AMPHIPRION FRENATUS Brevoort.

Two specimens taken at Shimoda, Izu, Japan, by J. Morrow, of Commodore Perry's expedition.

These are the basis of Gill's account<sup>1</sup> of *Amphiprion frenatus*, a species originally described from the Riu Kiu Islands.

<sup>1</sup>Proc. Acad. Nat. Sci. Phila., 1859, p. 148.

From near the original locality (Okinawa) we have also a single specimen received from the Imperial University of Tokyo.

These specimens differ in color and in the depth of the body.

The Okinawa specimen (in spirits) has the greater part of the body bright chocolate brown, without bands or stripes; lighter below and in the region of the pectoral fins. The Shimoda specimens have the body of a pale yellowish brown color, with three light lateral bands extending along the sides; wider apart and broader anteriorly, converging and becoming narrower on the caudal peduncle. Many of the scales of the body have each a small light spot. In each case the fore part of the head is of the same general color as the body. The width of the vertical band of blue varies somewhat in each individual.

The depth of the first-mentioned specimen is .53 of the total length; the scales between the lateral line and insertion of the dorsal are in 6 series; between the lateral line and the anal, 16. In the larger of the Shimoda specimens, which is of equal length with the one from Okinawa, the depth measures .56; the scales number 7-20. The smaller one measures, depth, .60; scales, 7-20. The scales in the lateral line of the three number, respectively, 46, 48, and 47 scales. The fin rays are as follows: Okinawa specimen D. IX, 19; A. II, 15; Shimoda examples D. IX, 19; A. II, 14, and D. IX, 17; A. II, 14.

Believing that these differences, though considerable, are of such a nature that a large series of specimens would show them to be merely individual variations, we do not deem it advisable to record the examples at hand as belonging to two different species.

#### 41. POMACENTRUS TRILINEATUS Bleeker.

(*Pomacentrus dorsalis* Gill.)

Shimoda, J. Morrow; the original type of *Pomacentrus dorsalis* Gill.

Dr. Bleeker regards *Pomacentrus dorsalis* as probably identical with *Pomacentrus trilineatus* from the East Indies. We are indeed unable to detect any difference between Gill's type from Shimoda and those two of Dr. Bleeker's figures<sup>1</sup> which correspond nearest to it in stage of development, showing two white bands on the anal, the blue dots on the head and the black dorsal ocellus, preceded by white, except that the body in the Shimoda specimen is a very little deeper, the depth 2 in length. This species belongs with the preceding and the next to the fauna of the rock pools flooded by the Kuro Shiwo. Except Gill's type no second specimen has been taken in Japan. This species having the teeth angulate at the tip, and in a single row, is a *Parapomacentrus* in Bleeker's arrangement. Bleeker says that the teeth are biserial, which would place it in his division *Pomacentrus*. We find but one row.

<sup>1</sup>Atlas Ichth., pl. cccvi, figs. 1 and 2.

## 42. POMACENTRUS RATHBUNI Jordan and Snyder, new species.

(Plate XXXIV.)

This species is characterized by having the preorbital smooth; the depth of the body contained  $2\frac{1}{3}$  times in length; the number of scales in the lateral series 27; the teeth subtruncate; the dorsal with 13 spines and 11 rays; the anal with 2 spines, 11 rays; the fin rays filamentous, and the fins without bands or spots.

Type No. 49706, U.S.N.M. Locality, near Yokohama, Japan; doubtless from Misaki or Boshu. Collected by P. L. Jouy.

Head  $3\frac{1}{2}$  in length; depth  $2\frac{1}{3}$ ; depth of caudal peduncle  $6\frac{1}{5}$ ; eye  $2\frac{2}{3}$  in head; snout 4; interorbital space 3; maxillary 3; dorsal XIII, 11; anal II, 11; scales in lateral line 27; between lateral line and insertion of dorsal 3; between lateral line and insertion of anal 9.

Eye large; somewhat oblong; interorbital space convex; its width equal to vertical diameter of eye. Snout short; rounded. Jaws subequal; cleft of mouth oblique; maxillary extending posteriorly to edge of orbit; its length equal to width of interorbital space. Teeth in a single row; firmly embedded; 42 in upper jaw, 34 in the lower; incisor-like; broad anteriorly, the cutting edge scarcely rounded; narrower and gradually becoming pointed posteriorly. Gill-rakers on first arch 21; long, slender, with minute bristles on the sides. Preorbital narrow, its edge not notched. Edge of suborbital serrated; not adnate to cheek. Posterior edge of preopercle finely serrated; the lower edge entire. Opercle with a rather large flat spine, above which are two closely opposed smaller ones.

Scales ctenoid. Head with scales everywhere except on preorbital, symphysis of lower jaw and branchiostegal region. Body completely scaled. Dorsal and anal fins with a low sheath of scales along their bases. Interradial membranes of dorsal, anal, caudal and pectoral fins with thin, oblong scales. Lateral line interrupted in the region of the seventeenth vertical row of scales, beginning again on the third row below, where it is represented by a single pit in each scale.

Dorsal spines growing longer consecutively to the fourth; others of about equal length; middle rays of dorsal filamentous. First anal spine about one-half as long as the second; the latter a little shorter than the rays; posterior rays filamentous. Caudal deeply forked; the longest upper and lower rays filamentous. Pectoral pointed, the upper rays longest. First (outer) ray of ventral filamentous.

No distinct color marks on alcoholic specimen. A mere suggestion of a dark spot immediately above gill opening; a small light brown spot at upper edge of base of pectoral; edges of unpaired fins narrowly washed with brownish; a narrow, indistinct, light band along the center of each lateral row of scales.



The cotypes (No. 6464, L. S. Jr. University Museum) show some variation in the shape of the body, being a little less deep than in the type and having a snout somewhat less arched. The eye also varies slightly in size.

The species is named for Richard Rathbun, assistant secretary of the Smithsonian Institution.

*Measurements of Pomacentrus rathbuni.*

Length in millimeters.....	55	57	58	52
Depth expressed in hundredths of length.....	15	13½	15	12½
Depth of caudal peduncle.....	15	15	15	15
Length of head.....	30	32	31	30
Width of interorbital space.....	8	9	8½	9
Length of snout.....	6	7½	8	8
Diameter of orbit.....	11½	10	9½	11
Distance from snout to dorsal fin.....	35½	33	34	34
Height of longest dorsal spine.....	21	19	18	18
Height of longest dorsal ray <sup>1</sup> .....	36	28	32	26
Distance from snout to anal fin.....	66	70	68	66
Height of longest anal spine.....	21½	22	21	22½
Height of longest anal ray <sup>1</sup> .....	27½	25	25	26
Length of caudal peduncle.....	19	19	20	20
Length of caudal fin <sup>2</sup> .....	32	30	28	29
Length of pectoral fin.....	27	25	27	25
Distance from snout to ventral fin.....	39½	41	43	38
Length of ventral fin <sup>2</sup> .....	21	21	22	22
Number of dorsal spines.....	13	13	13	13
Number of dorsal rays.....	11	11	11	11
Number of anal rays.....	11	11	11	11
Number of scales in lateral line.....	27	27	26	26
Number of scales between lateral line and insertion of dorsal....	3	3	3	3
Number of scales between lateral line and insertion of anal.....	9	9	8	9

<sup>1</sup> Including filaments.

<sup>2</sup> Not including filaments.

This species is allied to *Pomacentrus violascens* and others having the soft dorsal few-rayed and with some of the rays filamentous. Having the teeth truncate at tip and in a single row, it would be referred to Bleeker's genus *Eupomacentrus*, a group apparently not of generic value.

43. ABUDEFDUF SEXFACIATUS (Lacépède).

(*Glyphidodon celestius* Brevoort.)

Two specimens from Shimoda: Coll. J. Morrow, noticed by Professor Gill in 1859.

Numerous others were taken by us in the rock pools off Misaki.

44. CHROMIS NOTATUS (Schlegel).

729. Tsushima, Yokohama.

Family LABRIDÆ.

45. CHÆROPS AZURIO Jordan and Snyder.

(*Chærops japonicus* Schlegel, not of Houttuyn.)

609. Yokohama.

## 46. DUYMÆRIA JAPONICA Bleeker.

*Otenolabrus jagellifer* Schlegel, probably not of Cuvier and Valenciennes.  
Yokohama.

Everywhere common on the shores of Kiusiu and southern Hondo.

## 47. PSEUDOLABRUS EOTHINUS (Richardson).

(*Labrus rubiginosus* Schlegel; name preoccupied.)

No. 45301, U.S.N.M.

726, 729. Tsushima.

Five specimens in very bad order.

This species is generally common on the shores of Kiusiu and Hondo.

## 48. HALICHÆRES PÆCILOPTERUS (Schlegel).

606. Yokohama.

Generally common in sandy bays from Hakodate southward.

## Family CHELTONODONTIDÆ.

## 49. HOLACANTHUS SEPTENTRIONALIS Schlegel.

560, 596. Yokohama.

This handsome species, which is a true *Holacanthus* in Bleeker's classification, is rather rare about rocky points in the Kuro Shiwo.

## Family OPLEGNATHIDÆ.

## 50. OPLEGNATHUS FASCIATUM (Schlegel).

(*Hoplognathus krusensteri* Günther.)

567. Yokohama.

Common from Hakodate southward.

## Family TEUTHIDÆ.

## 51. PRIONURUS SCALPRUM (Cuvier and Valenciennes).

579. Yokohama.

Common about rocky points from Tokio southward.

## Family SCORPENIDÆ.

## 52. SEBASTODES FUSCESCENS (Houttuyn).

(*Sebastes inermis* Cuvier and Valenciennes.)

(*Sebastes ventricosus* Schlegel.)

No. 45273, U.S.N.M. Tsushima.

Generally common from Matsushima southward.

## 53. SEBASTODES JOYNERI (Günther).

Yokohama.

Not uncommon on the coast of Hondo. The form of the dark bars is subject to some variation.

## 54. SEBASTODES PACHYCEPHALUS (Schlegel).

575. Yokohama.

Rather common about rocks from Misaki southward.

## 55. HELICOLENUS MARMORATUS (Cuvier and Valenciennes).

No. 45310, U.S.N.M. Tsushima.

573, 598. Yokohama.

One of the commonest fishes in Japan and subject to large variations in color, according to its surroundings.

## 56. HELICOLENUS ALBOFASCIATUS (Lacépède).

Yokohama.

Found about rocks in the Kuro Shiwo or "black current" from the south, where it is rather common at some depth. This species is very close to *Helicolenus marmoratus*, differing chiefly in color and in the presence of a small spine below the eye which is wanting in the shore species, *H. marmoratus*. We are indebted to Dr. Franz Hilgendorf for an account of Lacépède's type of *Holocentrus albofasciatus*, still preserved in the museum at Berlin. This account agrees fully with the species in hand.

## 57. PARACENTROPOGON NUDUS (Günther).

Yokohama.

This little Okose or poison fish is common about rocks from Misaki to Hiroshima. None of our specimens from this region possess any scales. We therefore regard *P. nudus* as a species distinct from *P. longispinis*, which is said to have evident scales.

## Family HEXAGRAMMIDÆ.

## 58. HEXAGRAMMOS OTAKII (Jordan and Starks).

Yokohama.

Everywhere common from Hakodate southward.

## Family COTTIDÆ.

## 59. PSEUDOBLENNIUS PERCOIDES (Günther).

No. 45308, U.S.N.M. Tsushima.

No. 45309, U.S.N.M. (726.)

## 60. PSEUDOBLENNIUS SCHLEGELI (Döderlein).

602. Yokohama.

This form or species lacks the black spots and other dark markings characteristic of *Pseudoblennius percooides*, but is probably not specifically different.

## 61. PSEUDOBLENNIUS MARMORATUS (Steindachner).

No. 45306, U.S.N.M. Satsuma, Tsushima.

## Family PERISTEDIIDÆ.

## 62. PERISTEDION ORIENTALE Schlegel.

627. Yokohama.

This species agrees very ill with Schlegel's description, which was drawn up from an imperfect specimen. The dorsal especially is not continuous, but divided by a deep notch. It is not rare in deep water from Tokyo southward.

## Family CEPHALACANTHIDÆ.

## 63. CEPHALACANTHUS JAPONICUS (Bleeker).

(? *Dactylopterus peterseni* Nystrom.)

Yokohama.

Interorbital space very wide, half length of head, differing in this regard from *C. spinarella (orientalis)* of the East Indies. *D. peterseni* seems to be the young of this species, which is common about the headlands from Misaki to Nagasaki.

## Family SILLAGINIDÆ.

## 64. SILLAGO JAPONICA Schlegel.

584. Yokohama.

No. 26241, U.S.N.M. Tokyo (E. S. Morse).

Four rows of scales between dorsal and lateral line. Scales 70. Dorsal XI-1, 22. This species is probably different from *Sillago sihama* (Forsk.) found farther south.

## Family PERCOPHIDIDÆ.

## 65. NEOPERCIS SEXFASCIATA (Schlegel).

Yokohama.

Tokyo (E. S. Morse).

## 66. PARAPERKIS PULCHELLA (Schlegel).

612. Yokohama.

The generic name *Paraperkis* Bleeker 1872 (*cylindrica*) must replace *Percis*, which was first given by Scopoli to a genus of *Agonidae*. *Paraperkis* Steindachner is a different genus, subsequently called *Neoperkis* by the same author.

## Family ECHENEIDÆ.

## 67. REMORA SEXDECIMLAMPELLATA (Eydoux and Gervais).

Yokohama.

Plates 17. Perhaps identical with *Remora brachyptera* of the Atlantic. Comparison of specimens is needed.

## Family GOBIIDÆ.

## 68. CTENOGOBIUS SIMILIS (Gill).

(Plate XXXV.)

*(Rhinogobius similis* Gill, young.)*(Gobius yokohamae* Günther, female.)

Tsushima.

Specimens very large and dark, much larger than those from Tokyo, Nagasaki, or Lake Biwa. The male with the dorsal edged with white, the first spine produced in a long filament. Mouth larger and lips thicker in the male than in the female. This is the commonest species of goby in the streams and lakes of Japan, abundant everywhere southward in sluggish water among weeds. We have specimens from Tokyo, Lake Biwa, Tsushima, Aomori, Iyo in Shikoku, Kurume, Kawatana, and Nagasaki. We may perhaps recognize *Ctenogobius* (= *Rhinogobius*, *Acentrogobius*, etc.) as distinct from *Gobius*, wanting the free or silky rays of the upper side of the pectoral, which are characteristic of the typical species of *Gobius*, none of which are found in Japan. In *Ctenogobius*, as in *Aboma*, the isthmus is very broad, the mouth moderate, the tongue not notched, the head rounded above, and the scales rather large and ctenoid. *Aboma* apparently differs from *Ctenogobius* in having seven or eight anal spines instead of six.

## 69. ABOMA TSUSHIMÆ Jordan and Snyder, new species.

Collected at Sasuma, Tsushima, Japan, by P. L. Jouy.

Description of type No. 45351, U.S.N.M.

Head,  $3\frac{1}{2}$  in length; depth,  $5\frac{3}{5}$ ; depth of caudal peduncle,  $2\frac{3}{4}$  in head; eye, 4; snout,  $3\frac{1}{5}$ ; maxillary,  $2\frac{3}{5}$ ; D. VIII-12; A. 11; P. 17; scales in lateral series, 33; in transverse series, 9.

Body not notably elongate; gradually diminishing in size from the region of pectoral fins backward. Head as wide as body, but less deep. Snout very blunt; rounded when viewed from above; truncate when seen from the side.

Eyes high in head; directed obliquely upward; interorbital space very narrow. Jaws subequal, the lower slightly included. Mouth rather small; the cleft somewhat oblique. Lips large. Maxillary, except the tip of the distal end, concealed; extending to a vertical through a point a little behind anterior edge of orbit. Space between orbit and maxillary about equal to longitudinal diameter of eye. Tongue broad; rounded anteriorly; its free edge narrow. Teeth simple; in narrow bands on jaws; outer ones largest, slender, sharp, slightly curved; the ones on sides of lower jaw enlarged, though not notably so, there being no strong canines. Gill-opening not extending far forward; the width of isthmus about equal to length of maxillary. Inner edge of shoulder girdle projecting as a sharp ridge, without papillae or other dermal modifications. Gill-rakers on first arch, 2 + 7 or 8; short and pointed. Anterior nostril with a high rim. No barbels on jaw.

Head naked. Body with large, finely ctenoid scales; the region immediately anterior to pectorals, the breast in front of ventrals, and a narrow space extending backward nearly to vent naked.

Dorsal fins separate from each other and from the caudal; second spine highest; the others successively shorter, when depressed just reaching origin of soft dorsal; dorsal rays, when depressed, falling far short of base of caudal. Anal inserted directly below base of third dorsal ray; the rays somewhat longer posteriorly, when depressed extending as far back as the dorsal. Pectorals pointed, their tips reaching a vertical through insertion of soft dorsal; the upper rays with appendages. Ventrals long, not extending so far posteriorly as pectorals; free from body except at base.

Color in alcohol light brownish, everywhere with small, indistinct darker spots and reticulations; sides with six or seven poorly defined lateral spots, the last and most conspicuous one at base of caudal fin. Dorsals with markings of light brown, arranged in longitudinal rows on the membranes; similar marks assembled in wavy lines on the rays of upper three-fourths of caudal; the lower part of fin without spots. Other fins somewhat dusky.

Specimens smaller than the type have the dark markings a little more distinct.

Measurements of *Aboma tsushima*.

Length in millimeters .....	48	41	43	40
Depth expressed in hundredths of length .....	17½	16	15	15
Depth of caudal peduncle .....	9½	9	8	9
Length of head .....	28½	28	26½	27
Length of snout .....	10	10	9	9
Width of interorbital space .....	2	2	2	2
Diameter of orbit .....	7	7	7	8
Distance from snout to spinous dorsal .....	35	35	35	35
Distance from snout to soft dorsal .....	55	51	53	55
Height of longest dorsal spines .....	17	19	14	11
Height of longest dorsal rays .....	16½	14	14	17
Distance from snout to anal fin .....	57	56½	58	57
Height of longest anal rays .....	14	15	12½	14
Length of caudal peduncle .....	23	21	22½	23
Length of caudal fin .....	26	25	21	21
Length of pectoral fin .....	24	18	21	21
Length of ventral fin .....	21	22	23	22
Number of dorsal spines .....	8	8	8	8
Number of dorsal rays .....	12	11	11	11
Number of anal rays .....	11	11	11	11
Number of pectoral rays .....	17	17	17	16
Number of scales in lateral series .....	33	32	31	32
Number of scales in transverse series .....	9	8	8	9

## 70. ACANTHOGOBIUS FLAVIMANUS, (Schlegel).

586. Yokohama.

728. Tsushima.

Generally common in brackish water, throughout southern and middle Japan.

CHASMIAS Jordan and Snyder, new genus.

## 71. CHASMIAS MISAKIUS Jordan and Snyder, new species.

(Plate XXXVI.)

A single poorly preserved specimen of this form was collected by Jouy at Tsushima. We describe it from much better specimens collected at Misaki. The species very closely resembles *Chasmias dolichognathus* (Hilgendorf). It differs from it in coloration, not having very distinct, narrow, wavy, dark bands on pectorals, dorsals, and caudal, and in having a terminal band of white on the caudal, a sharper snout, and much smaller scales.

*Type*.—No. 6484. L. S. Jr. University Museum.

*Locality*.—Misaki, Sagami, Japan; Jordan and Snyder collectors.

Head, 3½ in body; depth, 4⅓; depth of caudal peduncle, 2½ in head; length of snout, 2⅔, maxillary, 1⅔; D. VI–11; A. 10; P. 21; scales in lateral series, 89; in transverse series, 28.

Body thick-set; the caudal peduncle deep; head very broad; depressed; wider posteriorly than the body; snout, viewed from above, broadly rounded. Eyes small; directed obliquely; interorbital space markedly wide, the distance between the eyes equal to the length of the snout. Mouth extremely large; horizontal; lower jaw included by the upper, the wide upper lips hanging down over the lower; upper lip with a fringed interior border next the teeth. Maxillary extend-

ing posteriorly to a vertical through a point midway between eye and edge of opercular flap; covered for the greater part of the length. Tongue very broad; slightly notched. Teeth villiform; none of them enlarged; in bands which extend backward a little less than half the length of mouth; pharyngeal teeth bristle-like. Gill-opening not large; the lower edge an eye's diameter below base of pectoral; the width of isthmus slightly greater than depth of caudal peduncle. Gill-rakers on first arch 3+10; short and slender; the length of longest less than diameter of pupil. No protuberances on inner edge of shoulder girdle. Lower jaw without barbels. Anterior nostril with a conspicuous short tube, widened at its opening.

Head naked; the skin thick; not much wrinkled nor folded; preorbital with a fleshy flap which extends forward and downward below nostrils. A conspicuous line of pores extends from a point above and posterior to the nostrils forward, and then downward along upper edge of preorbital flap where it divides; one branch running backward below the eye and curving upward behind it; the other backward toward the middle of cheek. A similar line of pores lies on either side of lower jaw between the folds of skin. A large pore on interorbital space between posterior parts of eyes. Body with small, thin, cycloid scales, which are more or less deeply embedded in the skin. Anteriorly the scales are closely crowded and somewhat irregularly placed; on the breast and belly they are minute and almost hidden beneath the skin.

Dorsal fins well separated; height of longest spines about equal to length of snout; posterior spine connected with the back by a large triangular membrane; rays somewhat higher than the spines, the longest about equal to depth of caudal peduncle; no membrane connecting posterior ray with the back. Anal equal in height to spinous dorsal; when depressed the anal and dorsal extend an equal distance posteriorly, both falling short of bases of first caudal rays a distance equal to one-half the depth of caudal peduncle. Caudal rounded. Pectoral rounded; its upper edge with a fringe of 14 or 15 thread-like filaments, of which each ray except the uppermost contributes two. Ventrals short; free from body posteriorly; the membrane connecting the spines fleshy; elevated; its height equal to diameter of eye; its edge concave.

Color in spirits, dark above; the throat and belly light; head with indistinct dots above, and scarcely discernible bars on cheeks; sides of body with irregularly shaped small white spots, in which a transverse arrangement is suggested. Dorsal, anal, and caudal fins edged with white, the white of caudal forming a distinct band; membranes of fins with indefinite light spots; first dorsal with a large, round, white spot just behind last spine, where the membrane is black; caudal with a large black blotch at its base followed by a transverse row of small white



spots, one on each ray. Pectorals and ventrals without spots except at the base of the former.

Length of the type, 100 mm.

Smaller specimens have the spots on top of head and the bars or spots on cheeks distinct; anterior parts of body with small, dark spots; sides with 8 or 9 transverse light-colored bands with small light blotches between them; in some cases the bands being broken up into elongate blotches. The dark caudal spot and the white terminal band are very distinct.

On the smaller specimens, a lateral line is suggested by a row of 29 groups of minute papillæ, extending along the middle of the sides. Each group has 5 or 6 papillæ in one, or occasionally two vertical rows, which are a little less than the width of a scale in length. A mere trace of the lateral line is seen on large specimens.

The specimen from Tsushima appears to have no light spots on the sides. The dark spot at base of caudal is scarcely perceptible.

This species is very abundant in the rock pools of the headlands of eastern Japan, from Tokio to Nagasaki. About Awa and Misaki it swarms in all the rock pools warmed by the Kuro Shiwo.

*Measurements of Chasmias misakius.*

Length in millimeters .....	115	100	99	95	80	79	61	53	49	51
Depth expressed in hundredths of length .....	19	20	18½	20	21	18	19	18	20	20
Depth of caudal peduncle .....	12	13	12	13	13	13	13	12	12	12
Length of head .....	33½	31	30	33	32	33	33	31	32	31
Length of snout .....	12½	12	12	12	11½	12	12	11	10½	11½
Width of interorbital space .....	8½	8½	7½	8½	8	8	7½	7	7	6½
Diameter of orbit .....	4½	4½	5	5	5	5	6	6	6½	6
Distance from snout to spinous dorsal .....	43	41	42	43	42½	42	44	42	42½	43
Distance from snout to soft dorsal .....	61½	61	62	62	61	61	61	61	61	61
Height of longest dorsal spines .....	11	12	10	11½	11	12	13	12	13	12
Height of longest dorsal rays .....	12	12½	10½	12	12½	12	14	16	13	14
Distance from snout to anal fin .....	66	65	67	65	66	65	67	67	65	66
Height of longest anal rays .....	11	11½	12	11	12½	12	13	13	15	11
Length of caudal peduncle .....	22	21½	21	22	22	22½	23	22	23	22
Length of caudal fin .....	21	22	22	21½	23	22½	24	25	26	23
Length of pectoral fin .....	18	19	20	21	20	19	22	23	22	21
Length of ventral fin .....	9	9	9½	10	10	10	12	12	14	12½
Number of dorsal spines .....	6	6	6	6	6	6	6	6	6	6
Number of dorsal rays .....	12	11	11	12	12	11	11	11	12	11
Number of dorsal anal rays .....	10	10	10	11	10	10	10	10	10	10
Number of pectoral rays .....	21	21	21	21	21	22	22	21	23	21
Number of scales in lateral series .....	92	89	88	91	85	81	90	92	89	.....
Number of scales in transverse series .....	27	28	26	26	28	28	25	29	29	27

This species is the type of a distinct genus, *Chasmias*, related to *Gillichthys* and *Platygobius*. It may be thus defined:

Body moderately elongate, covered with minute, cycloid scales. Head broad, naked, flattish above, wide between the eyes. Mouth very large, horizontal, the upper jaw projecting; teeth in moderate bands; maxillary much produced backward, extending beyond the eyes; tongue broad, not notched; isthmus very broad, the gill-openings restricted to the sides; no barbels; shoulder girdle without fleshy flaps. Dorsal fins short, low, the first of six slender spines, caudal rounded; pectoral with free silky tips to the rays above; ventrals short

and broad. Two species are known, the type, *Chasmias misakius* and the equally abundant *Chasmias dolichognathus*, of Hilgendorf, which is found all along the shore from Hakodate to Nagasaki, between tide marks.

72. CHÆTURICHTHYS STIGMATIAS Richardson.

This species, the habitat of which was heretofore unknown, is represented by two poorly preserved specimens collected at Sasima, Tsushima, Japan. Richardson's specimens collected by the "Sulphur" were in a bottle labeled "Southern Pacific," but Richardson observes: "As the bottle held several species from the China Seas, there appears some doubt as to the native place of the fish." It probably came from China.

One of our specimens is here described.

Head  $3\frac{1}{2}$  in length; depth 7; depth of caudal peduncle  $4\frac{3}{4}$  in head; eye  $4\frac{2}{3}$ ; snout  $3\frac{1}{4}$ ; maxillary 2; D. VIII-22; A. 19; P. 24; scales in lateral series about 57; in transverse series about 14.

Body elongate posteriorly, the dorsal and ventral contours sloping gradually to the caudal peduncle, which is narrow and compressed. Head large, wider than body, the width equal to distance from tip of snout to posterior border of eye.

Eyes high in head, oblong; directed obliquely upward, more of the eye being visible when viewed from above than when seen from the side. Interorbital space slightly concave. Mouth large, oblique; lower jaw projecting somewhat beyond the upper; lips thin; maxillary extending to a perpendicular through middle of pupil; entirely concealed beneath a pendulous dermal fold of the suborbital. Tongue broad, concave anteriorly. Teeth in two rows on each jaw, slender, pointed, and curved; those in outer row stronger and fang-like. Gill-opening extending far forward, the isthmus narrow. Three large papillæ on inner edge of shoulder girdle. Gill-rakers on first arch 3+11, long and slender. Lower jaw with three barbels on each side, the distance between them equal to the diameter of the orbit; anterior barbel shorter and thicker than the others.

Occiput, opercles, and preopercles with small, round, smooth scales, scarcely or not at all imbricated. Body with cycloid scales, small near the head, growing larger posteriorly.

Dorsal fins separate: the first 6 spines evenly spaced; the others farther apart. When depressed, the fin does not extend to insertion of soft dorsal. Dorsal rays growing higher from before backward; when depressed, reaching base of upper caudal rays. Anal inserted below base of third dorsal ray; the rays not reaching so far posteriorly when depressed as do those of the dorsal. Caudal long, pointed, with short accessory rays above and below (hence the name "chæturichthys"); short dorsal and ventral rays of the fin growing far for-

ward on the caudal peduncle. Pectorals pointed, extending to vent. Ventrals free from body posteriorly, extending to a point below base of seventh dorsal spine.

Body without distinctive color markings. Spinous dorsal with a large black spot on its posterior border. Soft dorsal, caudal, and pectorals with indistinct dark wavy markings. Ventrals and anal without dark markings, except a little dusky on posterior border of latter.

#### Family BLENNIIDÆ.

##### 73. ENEDRIAS NEBULOSUS (Schlegel).

45317. Tsushima.

Very common on all the coasts of Hondo.

##### 74. DICTYOSOMA TEMMINCKI Bleeker.

No. 45316, U.S.N.M. Sasuna, island of Tsushima.

Common about rocks of Hondo and Kiushu. The rudimentary ventrals, each of a single scale-like spine, disappear with age.

#### Family BROFULIDÆ.

##### WATASEA Jordan and Snyder, new genus.

Type of genus, *Watasca sivicola* (*Brotulidae*) Jordan and Snyder, new species. This genus is distinguished from *Sirenbo* (*imberbis*) by having two spines on the preopercle and the ventrals bifid. In *Sirenbo* the preopercle has no spines and the ventrals are reduced to slender, undivided filaments. From *Neobythites*, which is much more closely allied, *Watasca* differs in the presence of two stout spines on the preopercle. In *Hoplobrotula*, which is still closer, three stout spines on the preopercle are developed. *Marginatus* and perhaps other species hitherto referred to *Neobythites* belong rather to *Watasca*. The genus is named in honor of Dr. Sho Watase, formerly professor in the University of Chicago, now professor in zoology in the Imperial University of Tokyo.

##### 75. WATASEA SIVICOLA Jordan and Snyder, new species.

(Plate XXXVII.)

*Type*.—No. 6375, L. S. Jr. University collection.

*Locality*.—Misaki, Sagami, Japan.

*Collector*.—Dr. K. Mitsukuri.

*Cotype*.—U. S. National Museum, from off Yokohama (617). Coll., P. L. Jouy.

Head,  $4\frac{3}{4}$  in length; depth,  $5\frac{3}{4}$ ; eye,  $4\frac{3}{5}$  in head; snout,  $4\frac{1}{5}$ ; maxillary,

24; D. 93; A. 74; P. 25; scales in lateral line, 100; between lateral line and insertion of dorsal, 11; between lateral line and insertion of anal, 30.

Body very elongate; the deepest part in the region of anal opening from where it slopes evenly to the narrow base of caudal.

Snout, blunt and short; its length equal to longitudinal diameter of eye. Interorbital space convex. Jaws equal. Mouth large, oblique. Maxillary extending beyond the orbit a distance equal to about one-half the vertical diameter of eye; the entire upper edge slipping under the suborbital; the distal end broad, its posterior edge concave. Lips thin, their surfaces smooth. Jaws, vomer, and palatines with broad bands of closely-crowded, minute, blunt teeth; the palatine bands nearly two times as wide as those of jaws. Tongue with a long and narrow patch of similar teeth extending from symphysis of the first to that of the third gill arch; a small oblong toothed area at symphysis of fourth arch, separating the lingual plate from the lower pharyngeal. Upper part of pharynx with five small toothed patches on each side. Floor of pharynx with two narrow toothed surfaces, united before, diverging backward. Pseudobranchiae small, covering an area not much longer than the diameter of pupil. Gill-rakers on first arch 5 + 14; very long and slender near middle of arch; reduced to mere elevations toward the ends.

Dorsal surface of head with a V-shaped ridge; the apex above anterior edge of eye, the arms extending backward. A post-orbital ridge extending on each side parallel to the posterior parts of the first mentioned elevations. Upper rim of orbit with a slight ridge. Preopercle with two prominent flat spines projecting backward; the lower and larger at the angle; the other about one-half the diameter of eye above the lower opercle with a strong spine.

Head and body completely covered with small, oval, cycloid scales, which have minute striae radiating from the center. Scales on maxillary very small. Membranes of dorsal and anal with minute scales. Lateral line extending along upper third of body, disappearing at a point about one-half the length of head from base of caudal.

Dorsal fins continuous with the caudal; the distance between tip of snout and insertion of dorsal equal to one and one-quarter times the length of head; the rays of both fins a little higher on the posterior than on the anterior parts, the tips *filamentous*; last rays extending about to middle of caudal fin. Caudal long and narrow; the base truncate; the tip pointed. Pectorals rather acutely rounded. Ventrals inserted close together; near anterior edge of humeral symphysis; the distance between their bases about equal to one-third the width of posterior edge of maxillary; each fin with two rays, parted for about half their length.

Color in spirits bluish white throughout.

The species is represented in the Jouy collection by a single individual (No. 49707, U.S.N.M.), which is very similar to the type. It is from off Yokohama, probably from the same type locality of Misaki.

*Measurements of Watasca sivicola.*

Length of body in millimeters.....	217	208
Depth of body expressed in hundredths of length....	17½	17½
Length of head.....	21	21
Width of interorbital space.....	4½	4½
Length of snout.....	4	4
Length of maxillary.....	10	10
Diameter of orbit.....	4½	4½
Distance from snout to dorsal fin.....	26	25
Height of rays near middle of fin.....	6	6
Distance from snout to anal fin.....	44	44½
Height of rays near middle of fin.....	4½	5½
Length of caudal fin.....	8	7½
Depth of base of caudal.....	1	1½
Length of pectoral fin.....	12	12
Distance from snout to ventral fin.....	15	16
Length of ventral.....	14	14½
Number of rays in dorsal fin.....	93	92
Number of rays in anal fin.....	74	78
Number of rays in pectoral.....	25	26
Number of scales in lateral line.....	100	102
Number of scales above lateral line.....	11	11
Number of scales below lateral line.....	30	27

76. HOPLOBROTULA ARMATA (Schlegel).

(Plate XXXVIII.)

(*Brotula armata* Schlegel.)

Although this species is not represented in the Jouy collection, it will be of interest in connection with the genus and species just mentioned (*Watasca sivicola*) to record the character of a fine specimen 403 mm. long obtained at Nanaura, in Boshu, near Misaki. It was presented by the Imperial University of Japan to the Stanford University collection.

The genus *Hoplobrotula* differs from *Neobythites*, *Watasca*, and *Sirembo* in having three strong opercular spines, the maxillary and parts of the head naked, and the posterior upper part of the maxillary free from the suborbital. The ventral fins are bifid.

Head, 4½ in length; depth, 5¼; eye, 5½ in head; snout, 4½; maxillary, 1½; D., 86; A., 74; P., 20; scales in lateral line, 112; between lateral line and insertion of dorsal, 9; between lateral line and insertion of anal, 27.

Interorbital space convex; its width equal to length of snout. Jaws equal. Snout blunt; almost truncate. Maxillary extending posteriorly far beyond the eye; the upper edge not covered by preorbital for the entire length; the distal end broad; the posterior edge slightly concave. Lips rather thick; their surfaces covered by minute epidermal flaps. Jaws, palatines, and vomer with minute, sharp, firmly embedded teeth in villiform bands; a toothed area extending from near tip of tongue to posterior part of pharynx; roof of pharynx with toothed surfaces similar to those of jaws. Gill-rakers on first arch,

4+15; those of the upper limb and all but five on the lower reduced to mere rounded elevations; the others short and flat.

Preopercle with three strong spines projecting through the skin, the lower one pointing downward, the upper pointing backward and downward. Opercle with an elevated ridge at its upper part, terminating in a strong spine.

Opercles, preopercles, and a narrow area on each side of occipital part of head with oblong, cycloid scales; other parts of head naked. Body covered everywhere with scales similar to those of head. Lateral line ending a distance from base of caudal about equal to length of head.

Dorsal and anal fins continuous with the caudal; the membranes fleshy. Dorsal inserted a distance behind tip of snout equal to one and one-fourth times the length of head. Caudal narrow; pointed. Pectorals pointed. Ventrals inserted close together near anterior edge of humeral symphysis; the fins reduced to bifid filaments, cleft to within the diameter of pupil from the base; inner filament the longer.

Color dusky; overlaid with silver. Posterior halves of dorsal and anal dusky, the color near the ends becoming dark chestnut; the edges lighter. Caudal same color as the neighboring parts of dorsal and anal.

This species is known from Schlegel's account of a specimen in bad condition, and from a specimen taken near Tokio, described by Steindachner and Döderlein.

*Measurements of Hoplobrotula armata.*

Length of body in millimeters .....	371
Depth of body expressed in hundredths of length .....	19
Length of head .....	22
Width of interorbital space .....	5½
Length of snout .....	6
Length of maxillary .....	11
Diameter of orbit .....	4
Distance from snout to dorsal fin .....	27½
Height of rays near middle of fin .....	7
Distance from snout to anal fin .....	42
Height of rays near middle of fin .....	7½
Length of caudal fin .....	8
Depth of base of caudal .....	1½
Length of pectoral fin .....	15½
Distance from snout to ventral fin .....	11
Length of ventral .....	13½

Family GADIDÆ.

77. *LOTELLA PHYCIS* Schlegel.

Yokohama.

Common in rather deep water off the east coast of both Hondo and Kiusiu.

78. *PHYSICULUS JAPONICUS* Hilgendorf.

(*Physiculus dalwigki* Steindachner, not of European writers.)

Yokohama.

In deep water, not very common.

## Family PLEURONECTIDÆ.

## 79. KAREIUS BICOLORATUS (Basilewsky).

*(Pleuronectes scutifer* Steindachner.)

Yokohama.

Generally common off northern Hondo and Hakodate.

## 80. PLEURONICHTHYS CORNUTUS (Schlegel).

Yokohama.

Common throughout Japan in sandy bays.

## 81. ZEBRIAS ZEBRA (Bloch).

564. Yokohama.

The Japanese species, *Zebrias zebrinus* (Schlegel), is not evidently different from the Chinese form, *Zebrias zebra*

## Family LOPHIIDÆ.

82. LOPHIOMUS<sup>1</sup> sp. indescr.

611. Yokohama.

Not rare in water of moderate depth.

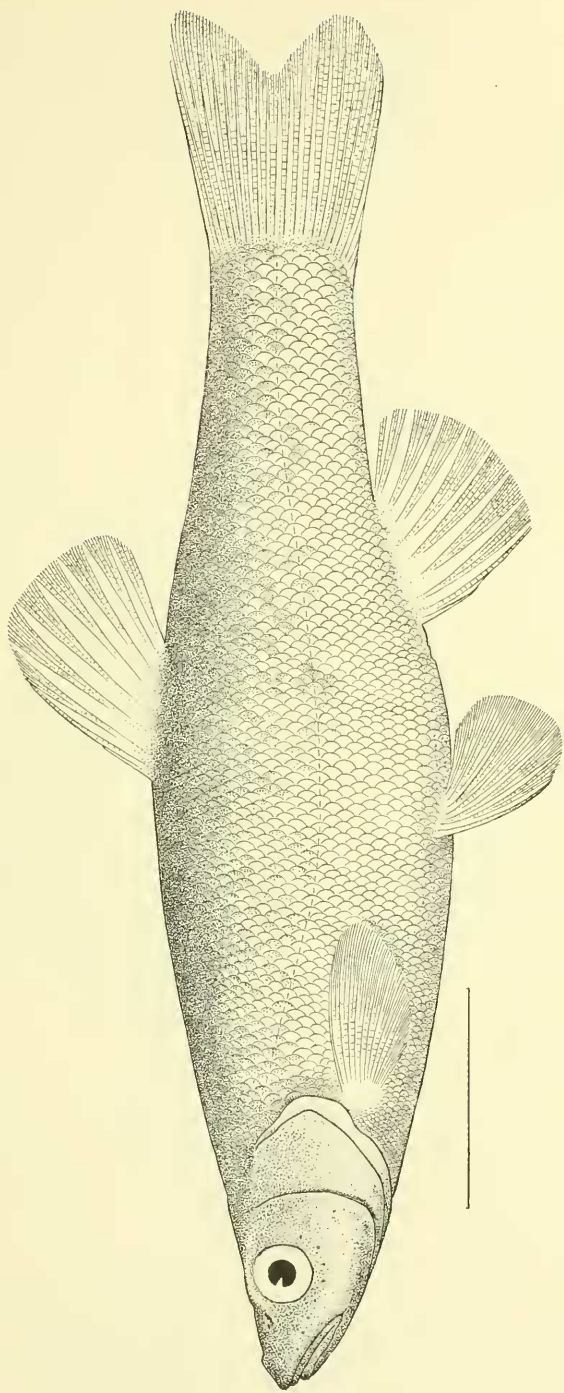
## Family ANTENNARIIDÆ.

## 83. ANTENNARIUS TRIDENS (Schlegel).

Yokohama.

Everywhere common in sandy or muddy bays and inlets.

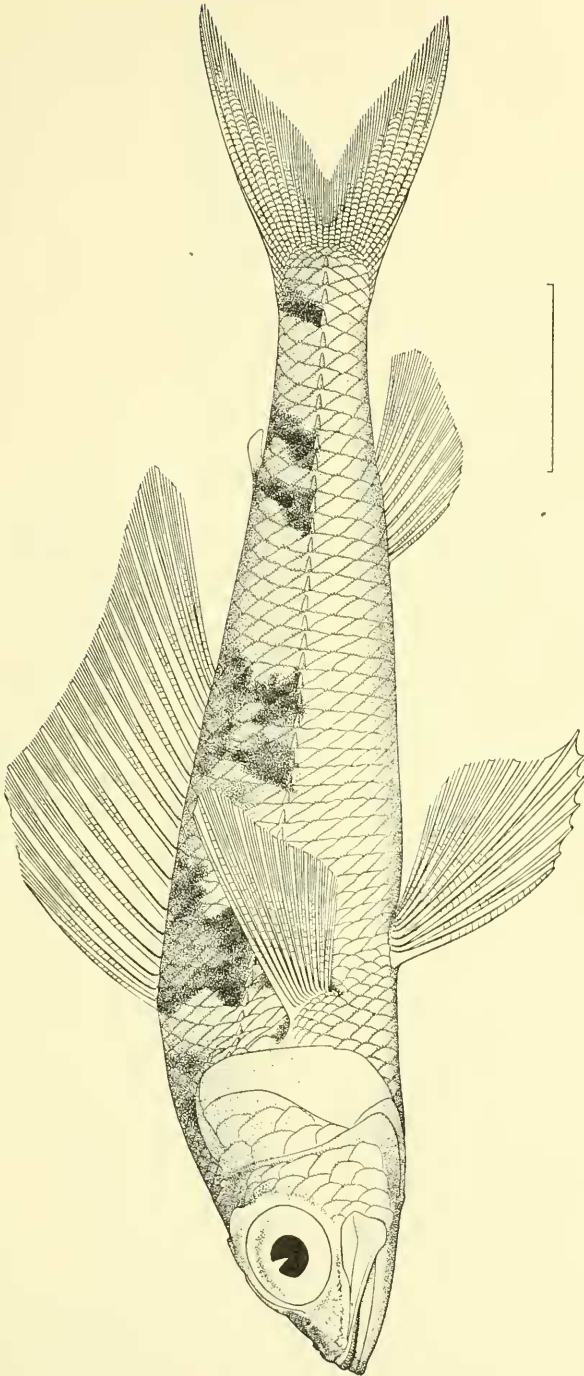
<sup>1</sup>This specimen proves to belong to a species distinct from *L. setigerus* Vahl, to be described later.



LEUCISCUS JOUYI.

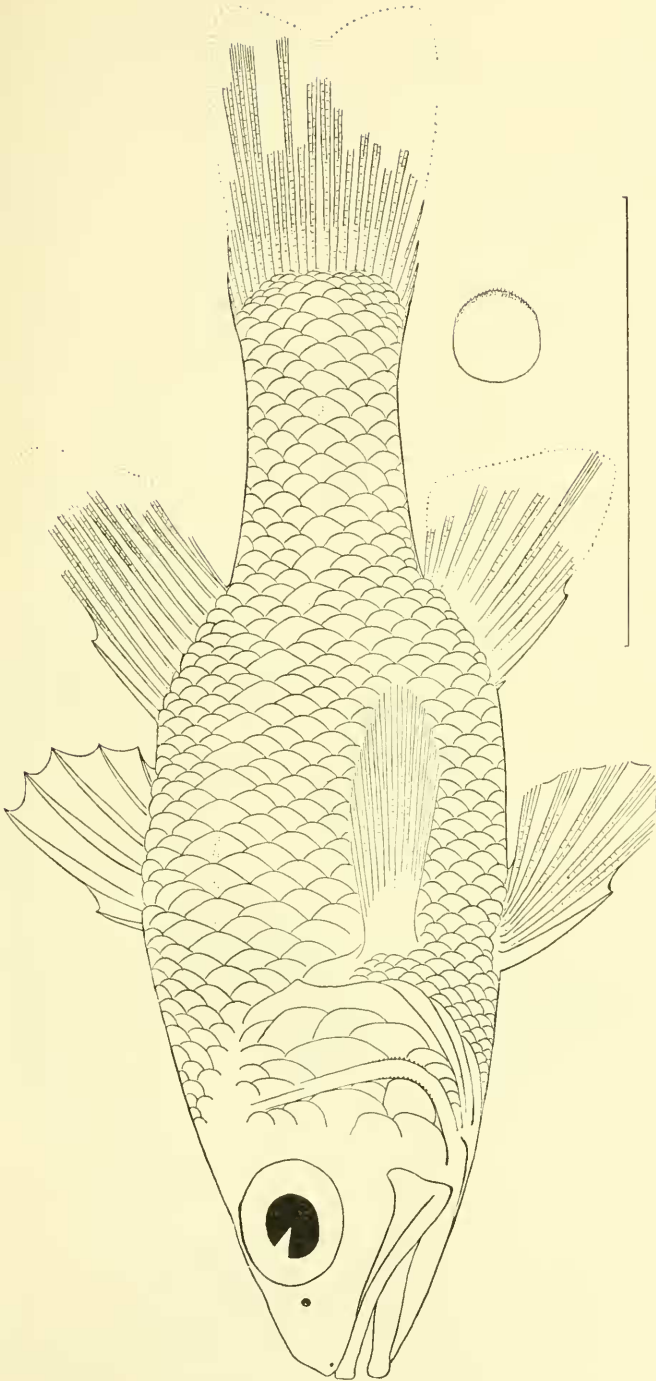
FOR EXPLANATION OF PLATE SEE PAGE 741.





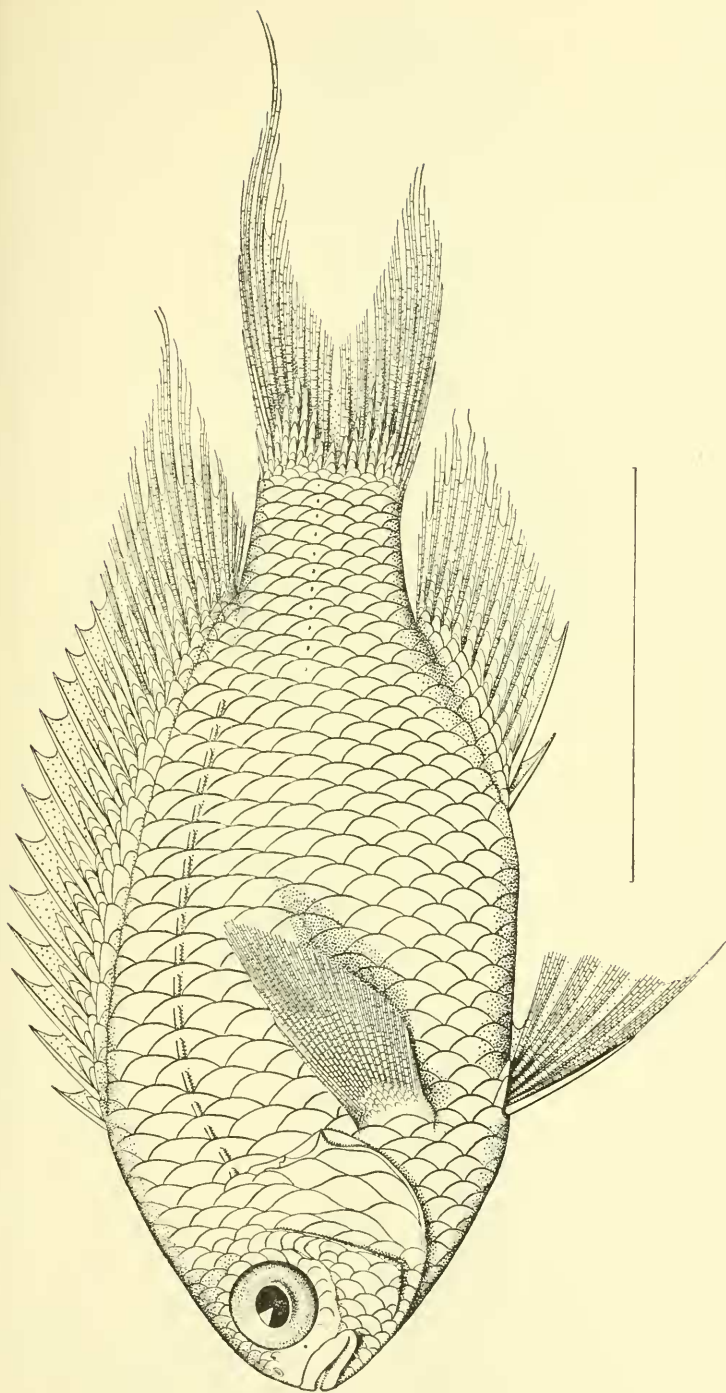
AULOPUS JAPONICUS.

FOR EXPLANATION OF PLATE SEE PAGE 744.



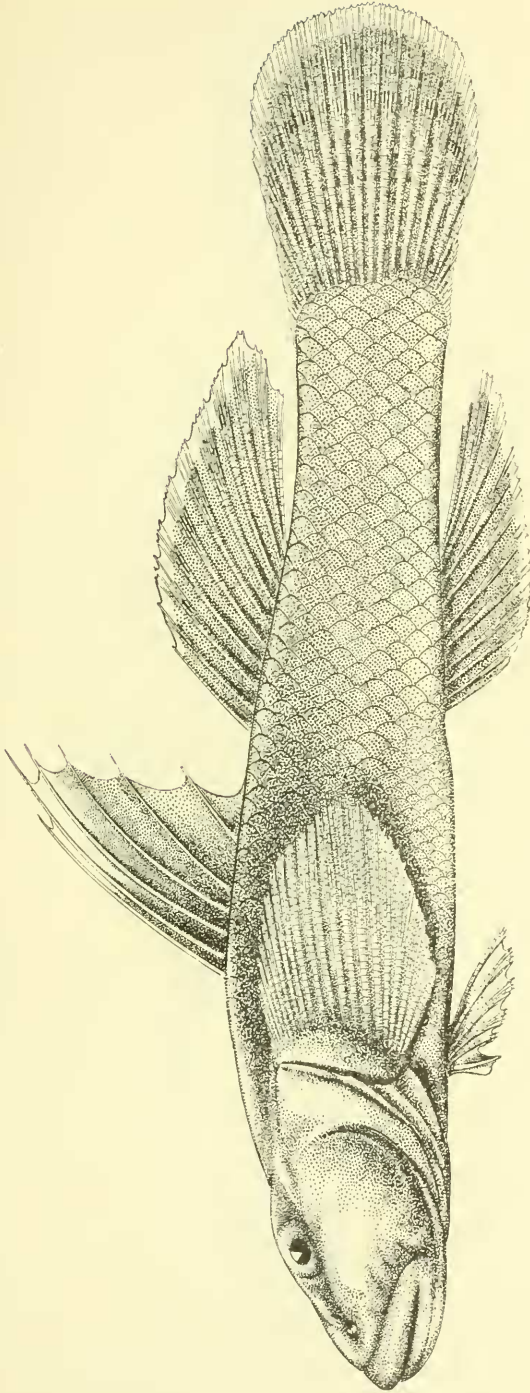
APOGON UNICOLOR.

FOR EXPLANATION OF PLATE SEE PAGE 749.



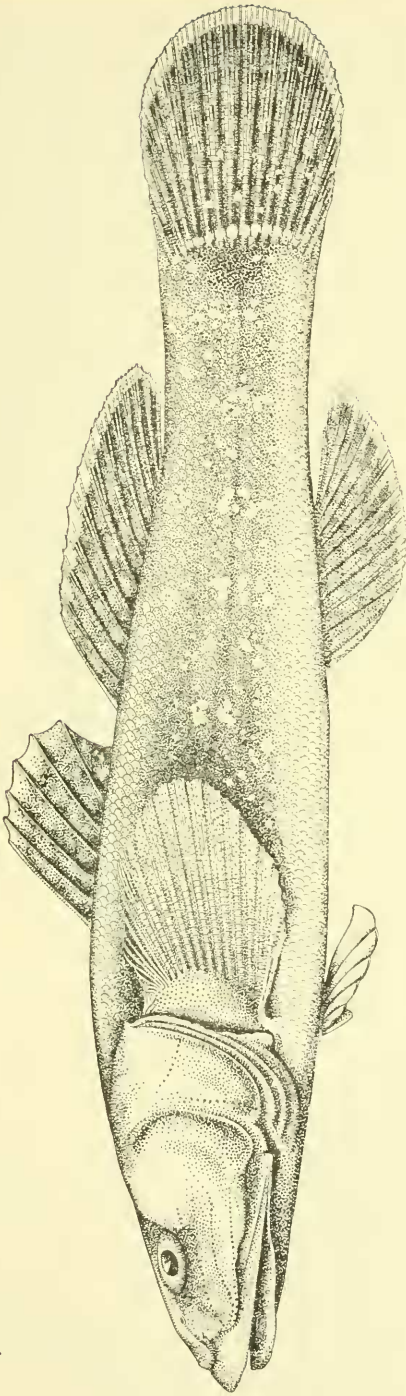
POMACENTRUS RATHBUNI.

FOR EXPLANATION OF PLATE SEE PAGE 754.



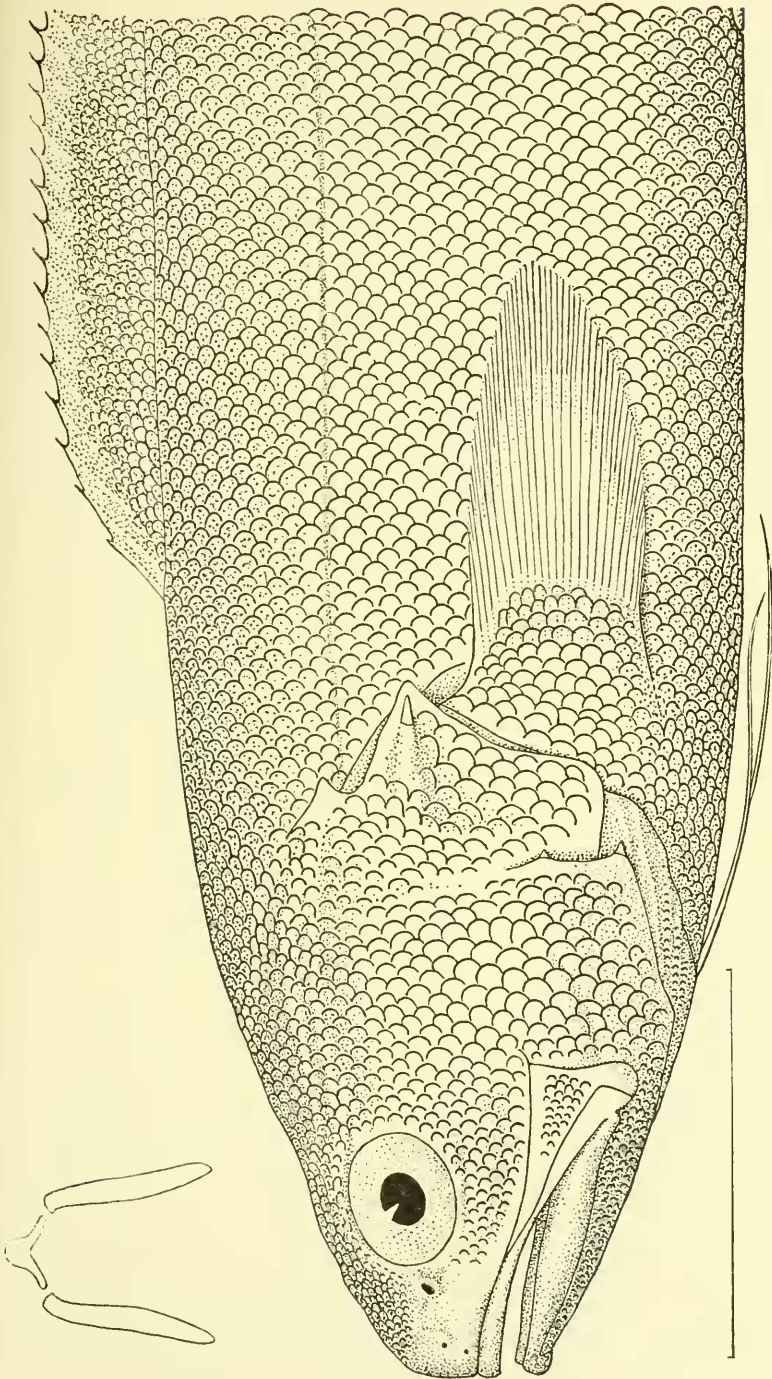
CTENOGOBIOUS SIMILIS.

FOR EXPLANATION OF PLATE SEE PAGE 759.



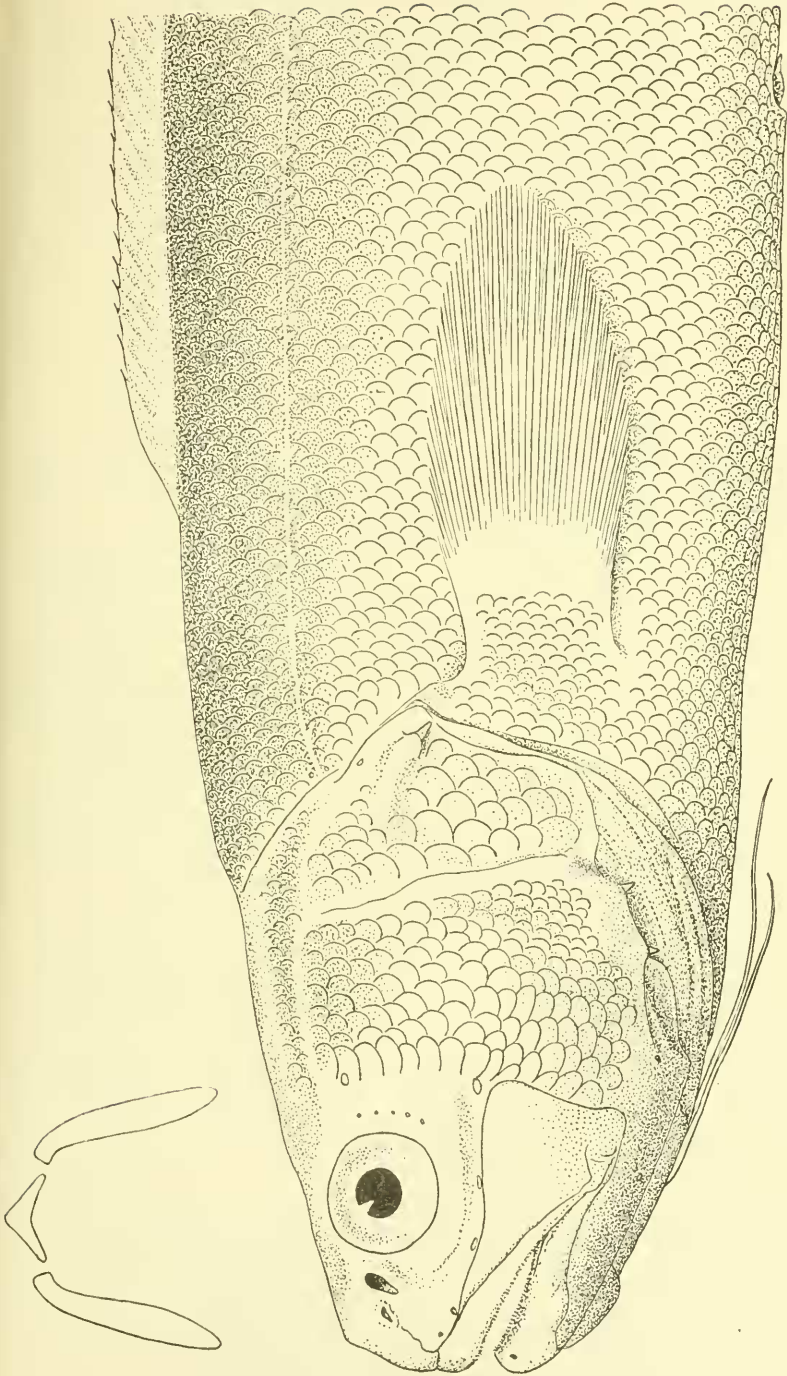
CHASMIAS MISAKIUS.

FOR EXPLANATION OF PLATE SEE PAGE 771.



WATASEA SIVICOLA.

FOR EXPLANATION OF PLATE SEE PAGE 765.



HOPLOBROTULA ARMATA.

FOR EXPLANATION OF PLATE SEE PAGE 767.